**GENETICS/EMBRYOLOGYPROJECT**

DROSOPHILA BREEDING EXPERIMENT

A. Possible types of characteristics of the flies

1. Vestigial wings 4. Bar eyes 6. eyeless

2. White eyes 5. Apterus

3. Miniature

B. Possible types of crosses

1. Autosomal dominant 3. Autosomal recessive 5. Incomplete dominant

2. Sex-linked dominant 4. Sex-linked recessive 6. Sex-linked incomplete dominant

C. Use the Scientific Method to do the experiment and write the paper

1. Define the problem - a brief description of the purpose of the experiment and objectives

2. Collect related information - life history, techniques, sexing, virgin test

3. Form a hypothesis - one definite statement of what you think will happen in the experiment,

including experimental ratio

4. Experiment to test the hypothesis - steps, procedures, materials

5. Observations and collect data - record of F 2 counts (chart), log

6. Draw conclusions - tell why or why not hypothesis supported, Chi square analysis

7. Publish results - write your paper

D. Extras for graduation project

1. Prepare a visual (poster, power point, CD movie, etc. on your project)

2. Prepare a 5 minutes presentation on your experiment

E. GRADING RUBRICK

10 points - use of scientific method

10 points - paragraphs, not outline, with correct grammar, spelling, etc.

10 points - Chi square correctly done and analyzed

20 points - proper log

25 points - all required parts in scientific method as given in notes are present

and correct, including the count chart properly completed

25 points - experiment completed all the way through with the flies

**Overview of a Course-Based Graduation Project**

**Department -** Science **Course -** Genetics/Embryology 3426

**Title of Project -** Drosophila Breeding Experiment

**Goals of Project -** To breed fruit flies through two generations and determine,

using the scientific method, the way a certain trait is inherited

**Description of Project -** Breeding of flies to the F2 generation

**Activities of the Students -**

1. The students will receive information on the scientific method, breeding methods and

virgin test

2. The students will be given fruit flies and necessary materials for breeding

3. The students will culture wild and mutant fruit flies to get virgin female flies of

one type, then mate the virgins with the opposite type male

4. The students will take F1 offspring and breed them together to make F2 offspring

5. The students will make counts of the types of flies produced in the F2 generation for

12 days

6. The students will keep a log of their activities with the flies throughout the experiment

7. The students will research the fly life cycle, traits, types of inheritance, breeding

habits of the flies

8. The students will prepare a paper, using the scientific method as a guide, on their

experiences

9. The students will make a 5 minute presentation of their results and experiences as

well as a visual representation of the fly experiment

10. The students will do a Chi square analysis of the experimental results

**Resources Used -** fly manual, class notes, text book, internet

**Project Requirements -** written paper, log, visual presentation, oral presentation, out-of-

class time with the flies

**Research Component -** Before proposing a hypothesis, the students must do research

into the fly life cycle, trait type, inheritance patterns, breeding

methods

**Presentation Requirements -** Student must present a visual (poster, power point, CD

movie, etc. and a 5 minute oral presentation on their

experiences

FLY PAPER RUBRIC

\_\_\_\_\_\_\_\_ 10 points - use of scientific method

1. Research

2. Hypothesis

3. Experimental Design

4. Results

5. Analysis/Conclusion

\_\_\_\_\_\_\_\_ 10 points - paragraphs, not outline, with correct grammar, spelling, etc. (One point lost for every **blatant** spelling and/or grammatical error)

\_\_\_\_\_\_\_\_ 10 points - Chi square correctly done and analyzed

\_\_\_\_\_\_\_\_ 10 points - proper log – Dates for the following: Crosses, Sorting

\_\_\_\_\_\_\_\_ 35 points – Written Component:

1. Research – Background information (Fruit Flies Chromosomal Constitution, Life Cycle summary, gene location of your variation)
2. Hypothesis – (Proposed results of the F1 and proposed results of the F2)
3. Procedure
4. Results
5. Analysis/Conclusion
   1. Results summary. Resummarize the procedure and explain the results through the proper inheritance pattern. What trends are noticeable in the data? How does the phenotypic ratio lend itself to a specific pattern of inheritance?
   2. Chi Squared – Does your data accept or reject your proposed ratios. (from the research)
   3. What errors may have occurred and **EXPLAIN** how those errors have an impact on the results of the data.
   4. Future Considerations – What did you learn during the process of this research. Is there any research that states your phenotype is dependent upon an environmental source. (i.e – temperature)
6. Works cited – Proper MLA format

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